

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

1/21

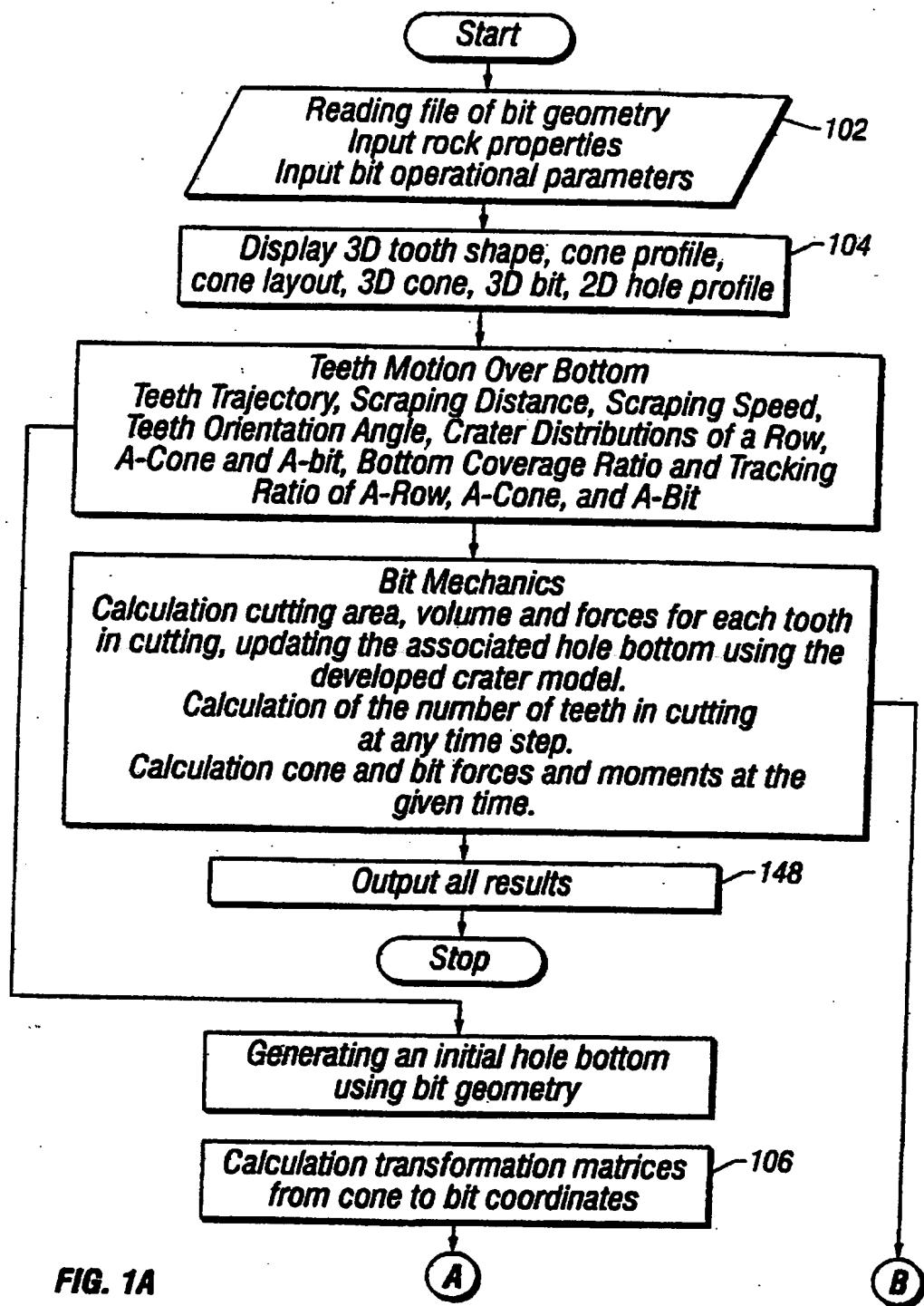


FIG. 1A

2/21

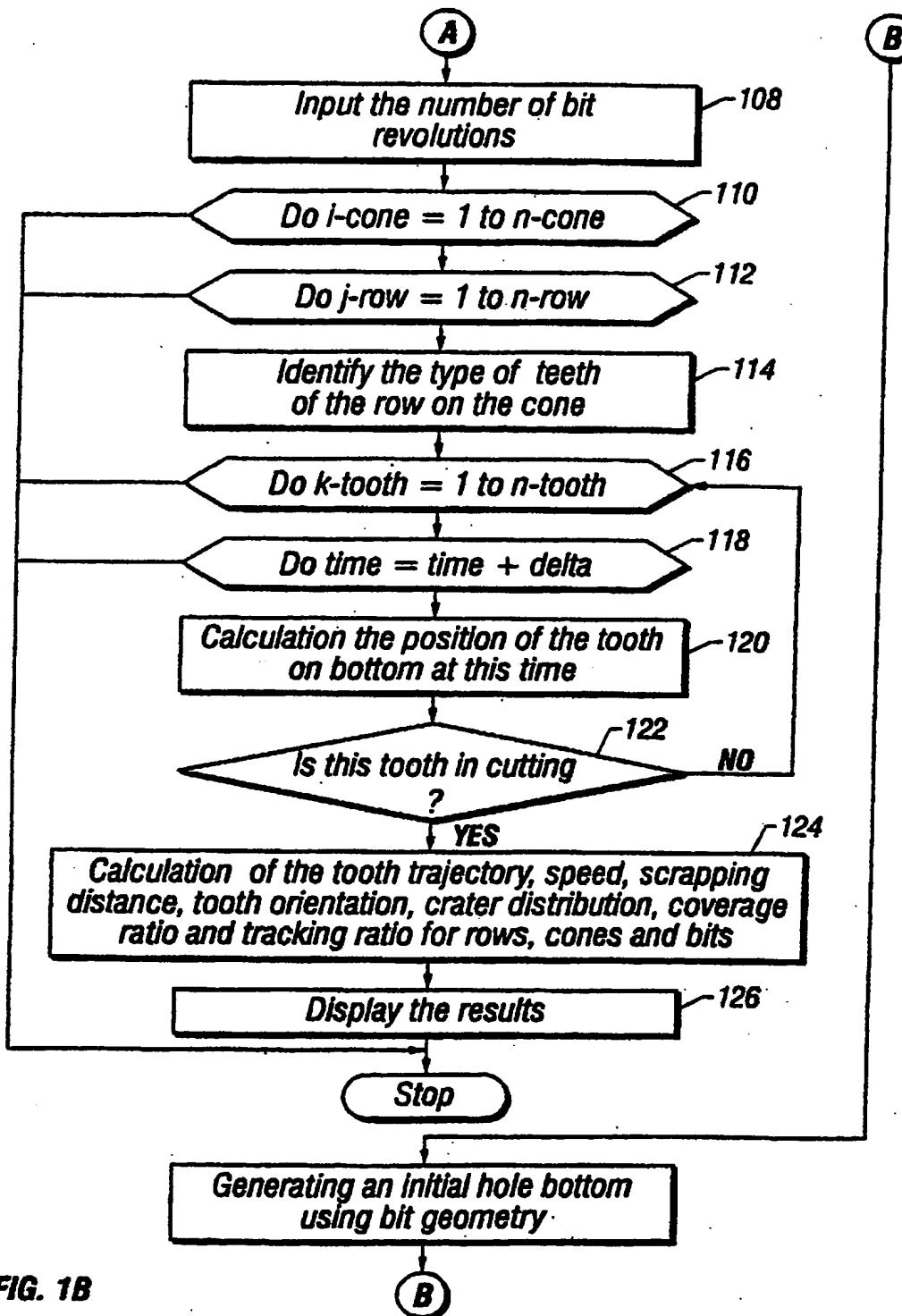


FIG. 1B

3/21

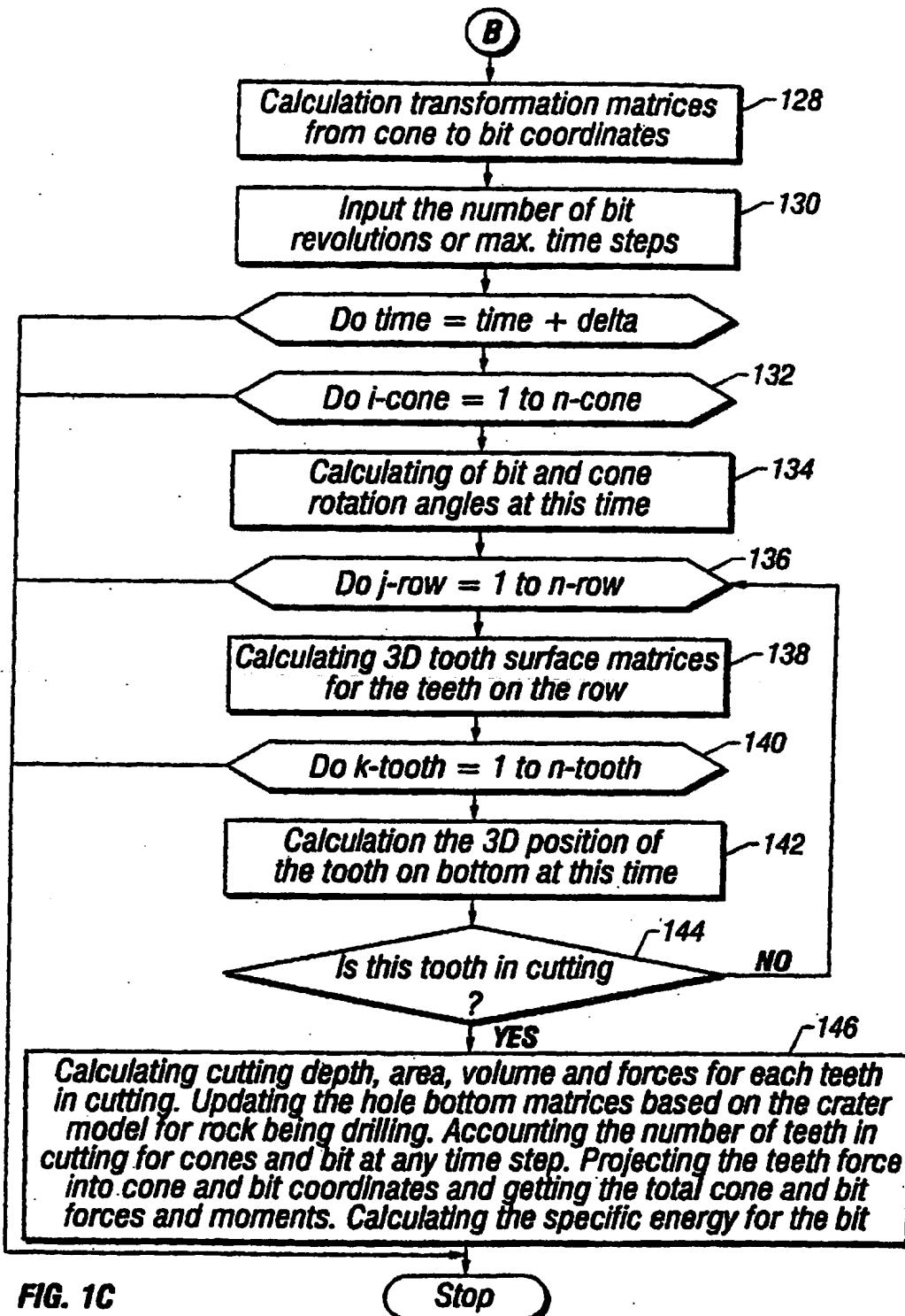


FIG. 1C

4/21

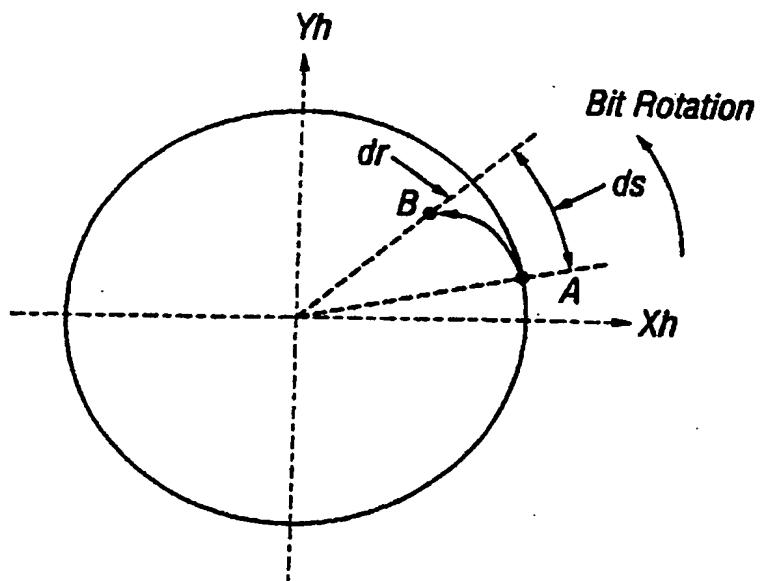


FIG. 2

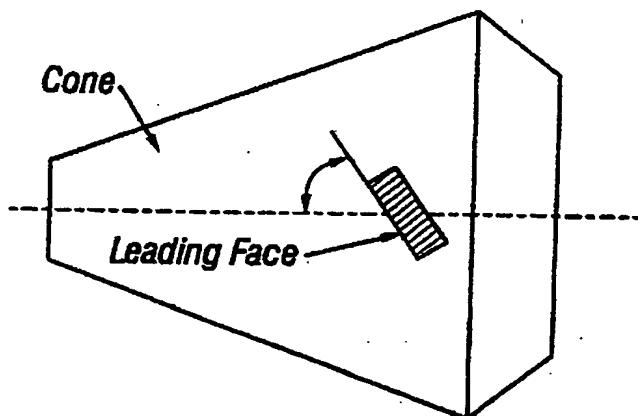


FIG. 5

5/21

Cone No.: 1; Row No.: 1; Bit Name: era22d; Offset: 4

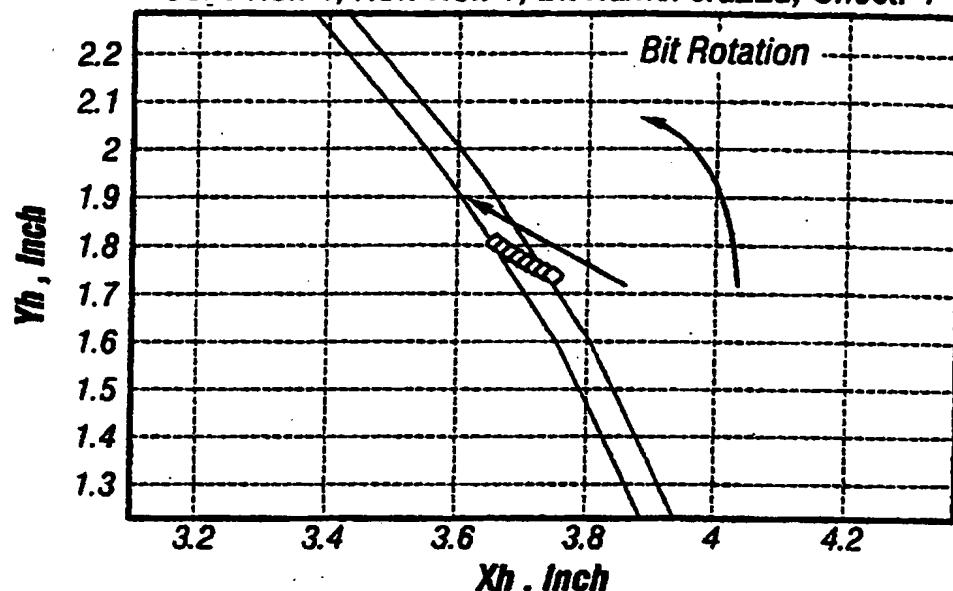


FIG. 3A

Cone No.: 1; Row No.: 2; Bit Name: era22d; Offset: 4

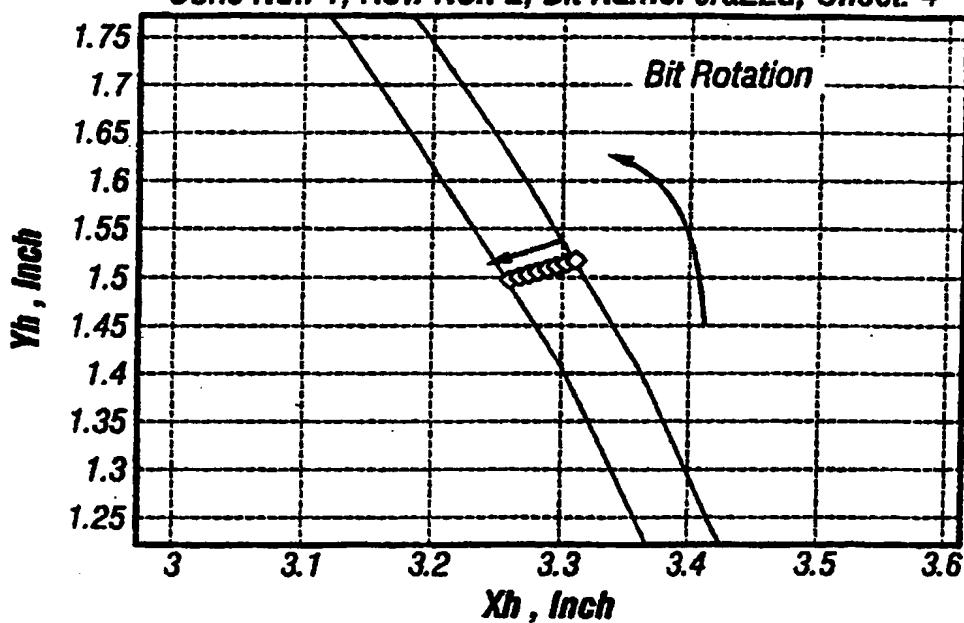


FIG. 3B

6/21

Cone No.: 1; Row No.: 3; Bit Name: era22d; Offset: 4

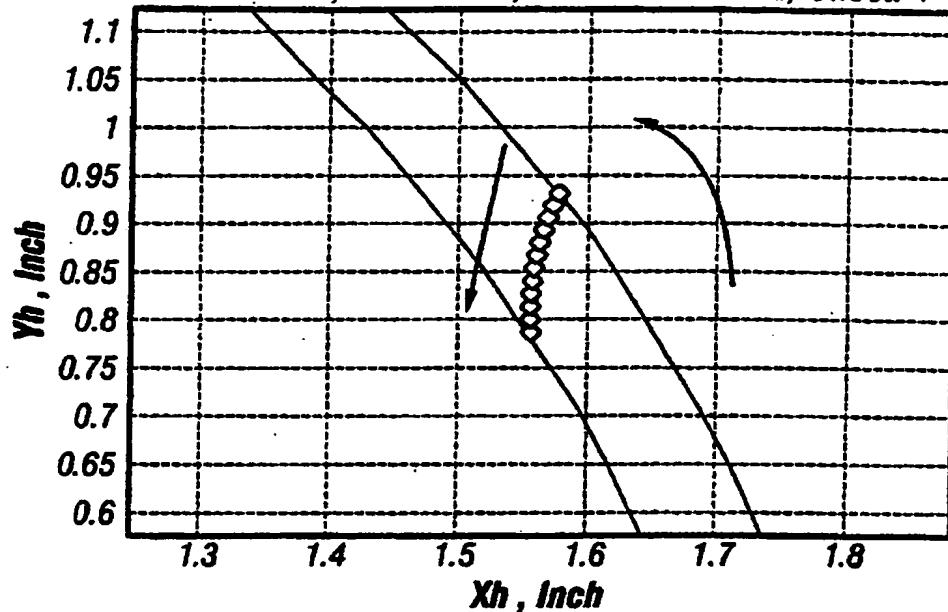


FIG. 3C

Cone No.: 1; Row No.: 4; Bit Name: era22d; Offset: 4

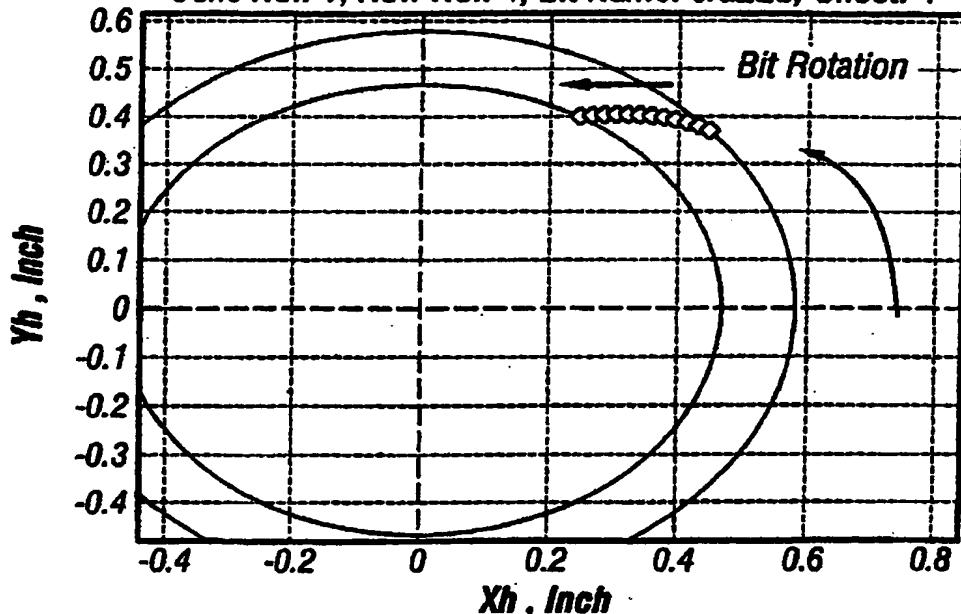
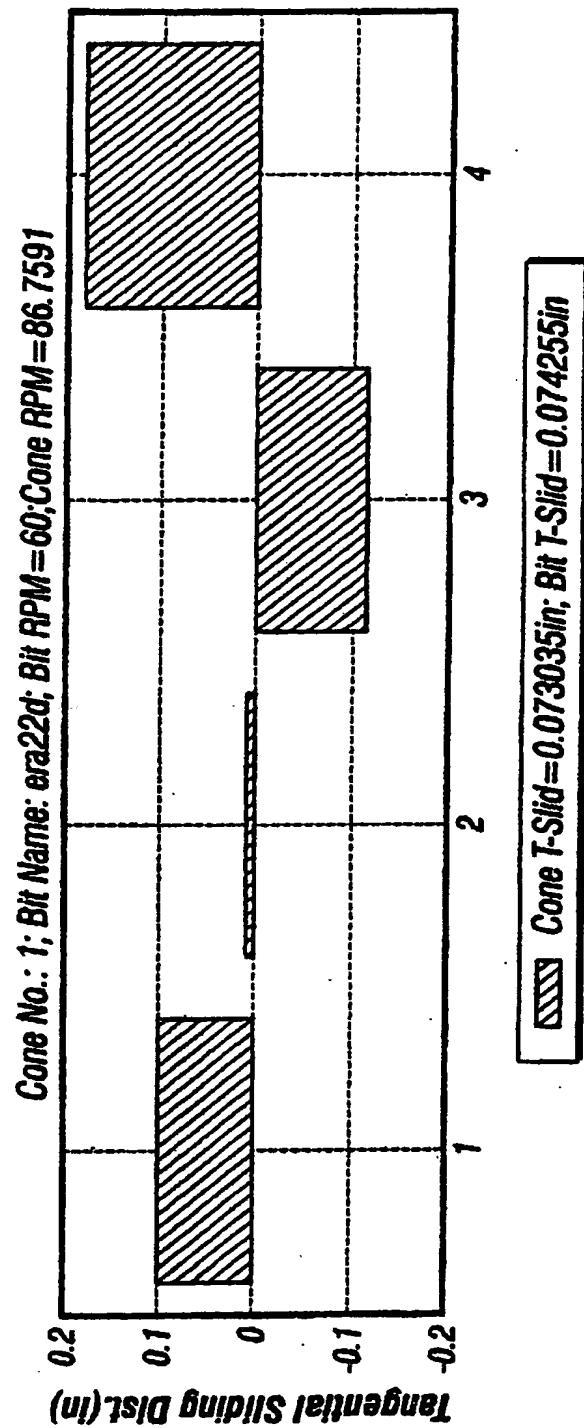


FIG. 3D

7/21



8/21

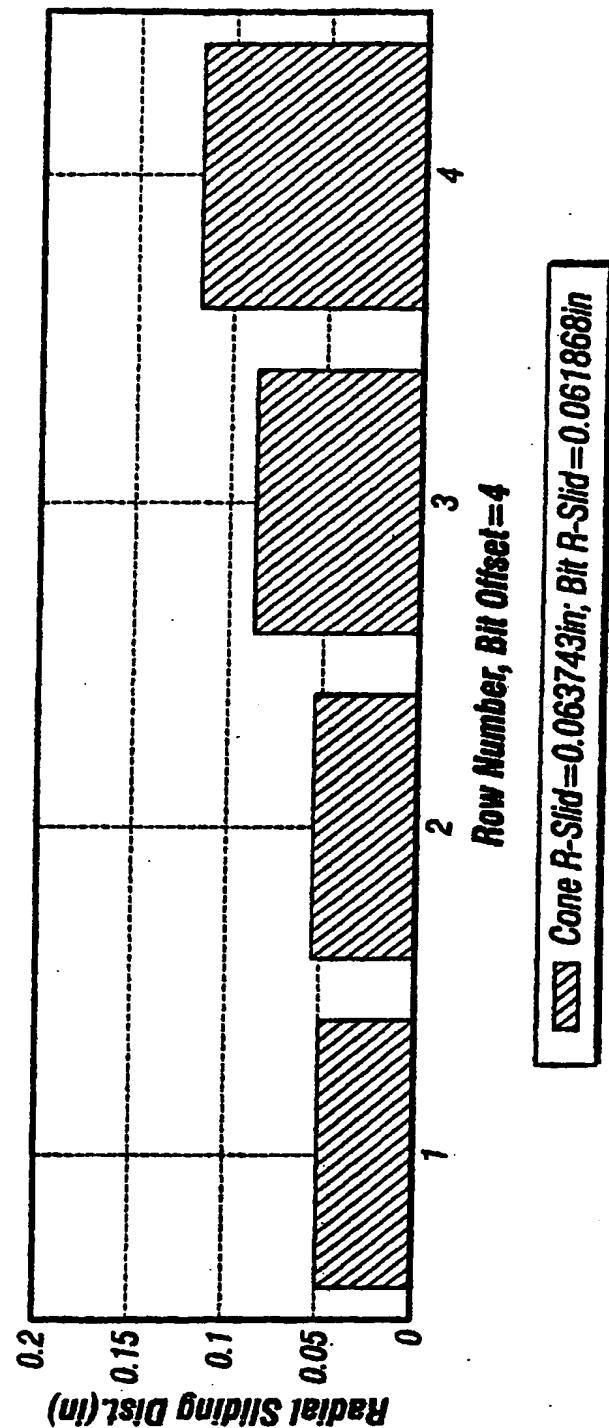


FIG. 4B

9/21

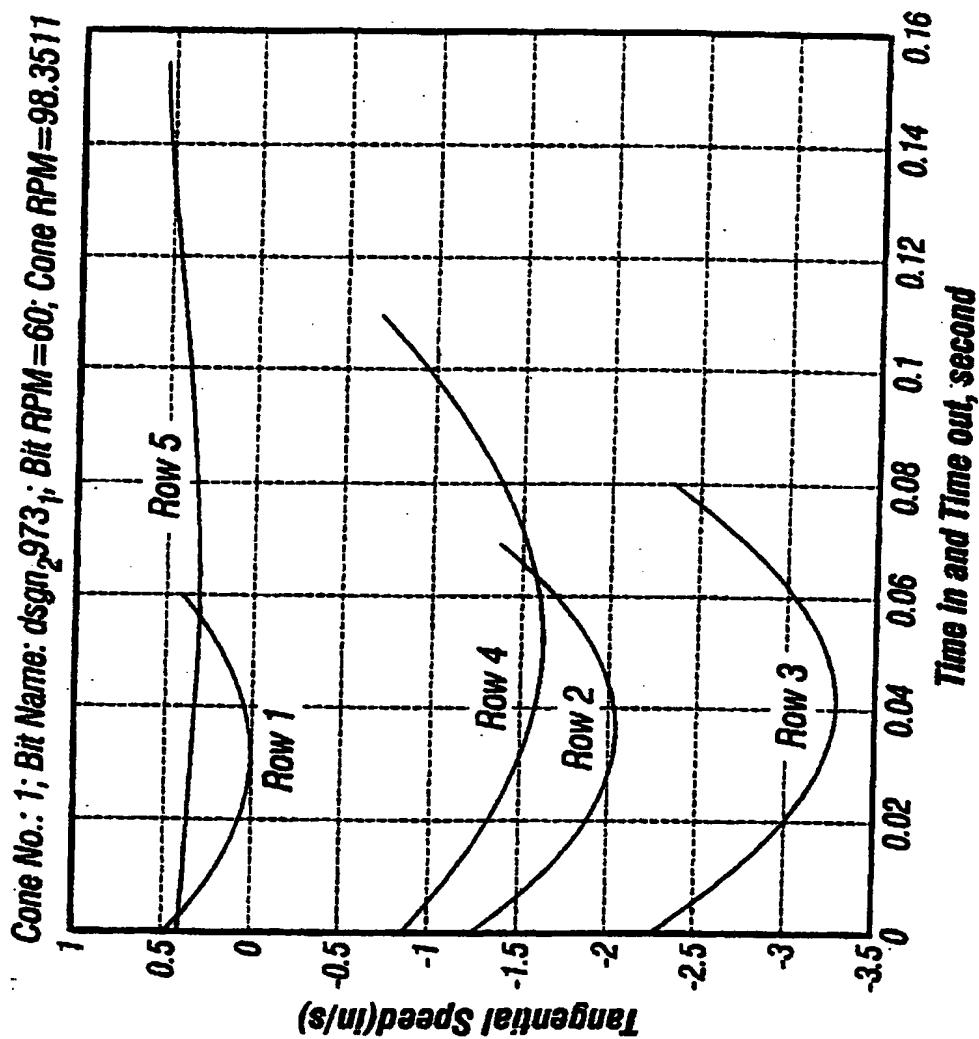


FIG. 6

10/21

Bit: era22; 8.5 Inch;
Radial Cutting Ratio = 84.6288%

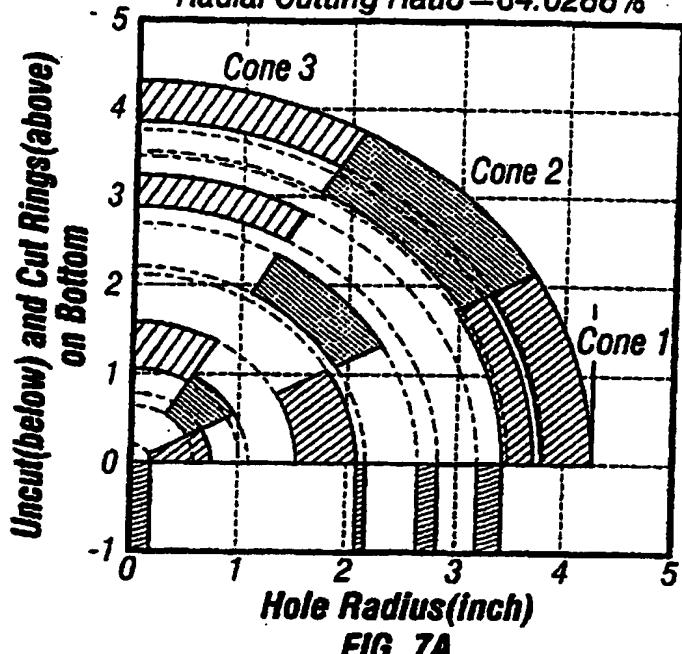


FIG. 7A

Bit: era22; 8.5 Inch;
Radial Cutting Ratio = 96.5438%

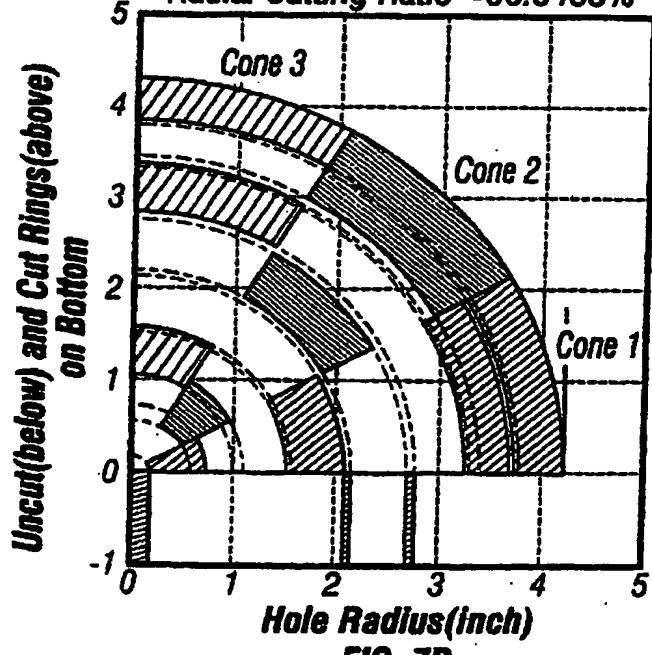


FIG. 7B

11/21

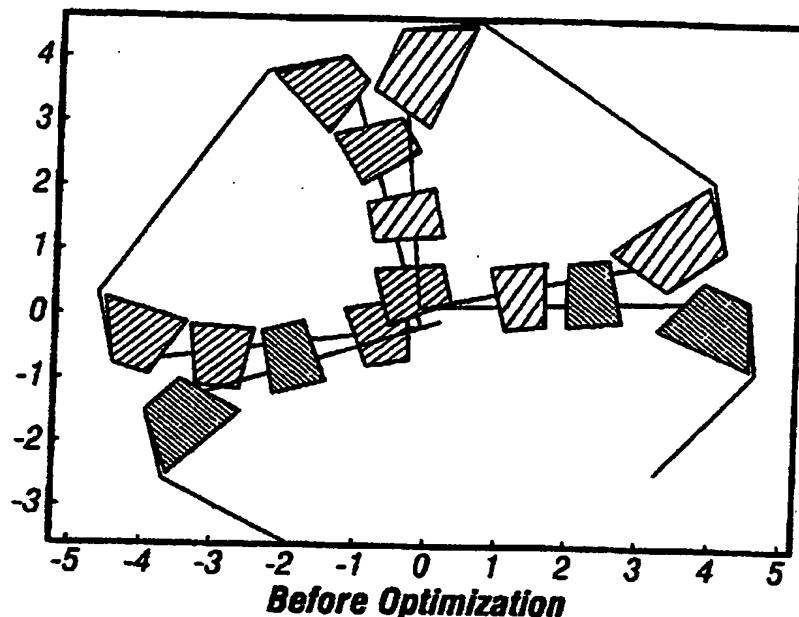


FIG. 8A

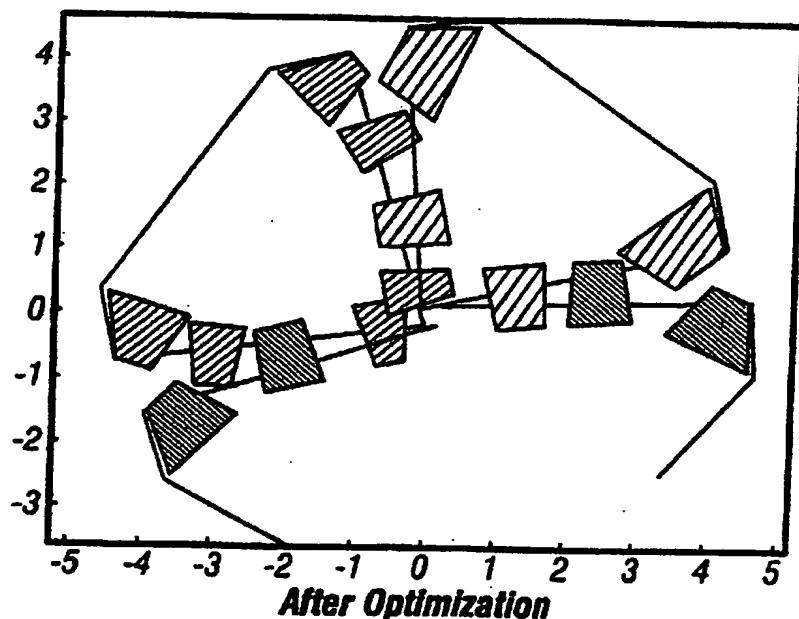


FIG. 8B

12/21

ERA22_V Cone No.1

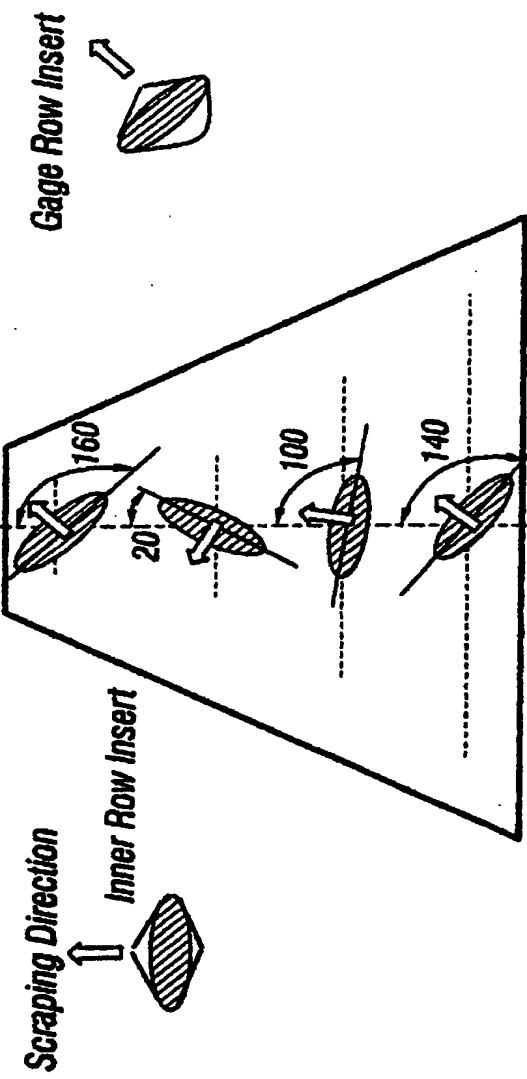


FIG. 9A

Title: ROLLER-CONE BITS, SYSTEMS, DRILLING
METHODS, AND DESIGN METHODS WITH OPTIMIZATION
OF TOOTH ORIENTATION

Inventor: Shilin Chen Serial No: To Be Assigned
Filed: January 28, 2004

Attorney Docket No.: 074263.0208 Sheet 13 of 21

13/21

ERA22_V Cone No.2

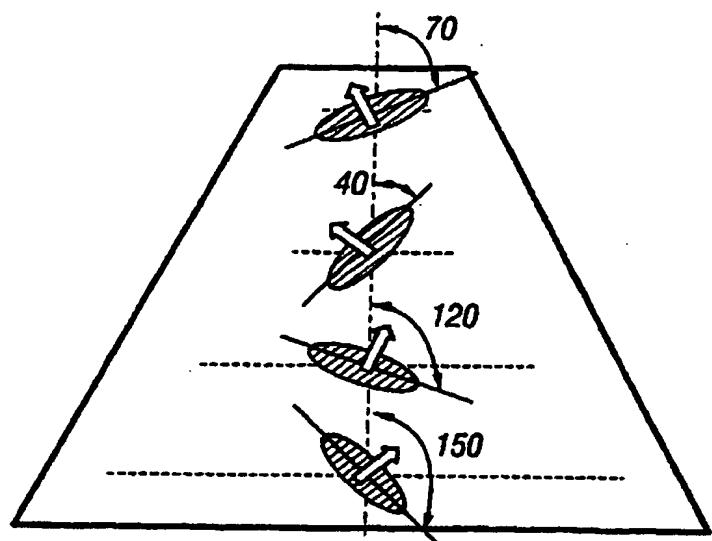


FIG. 9B

ERA22_V Cone No.3

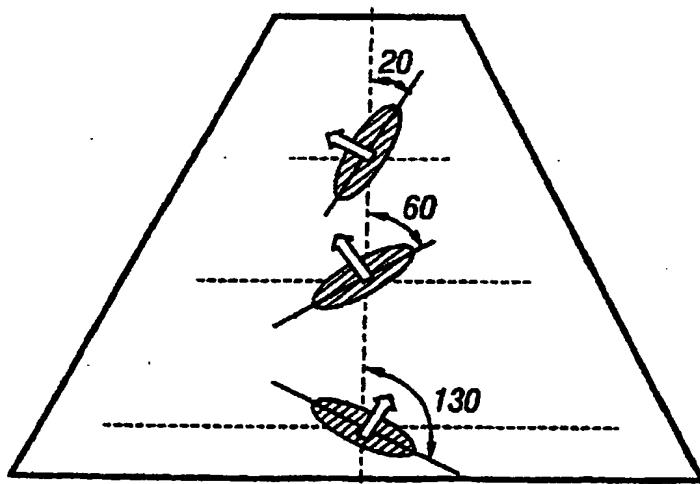


FIG. 9C

14/21

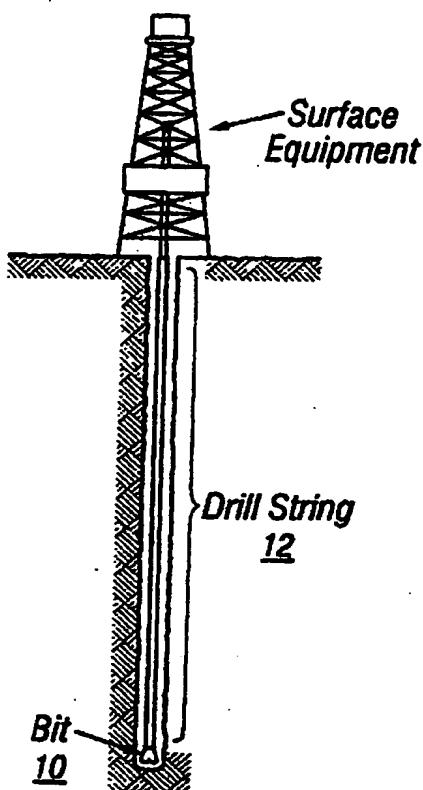


FIG. 10

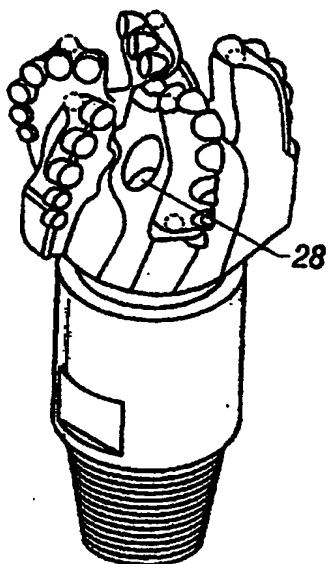


FIG. 11

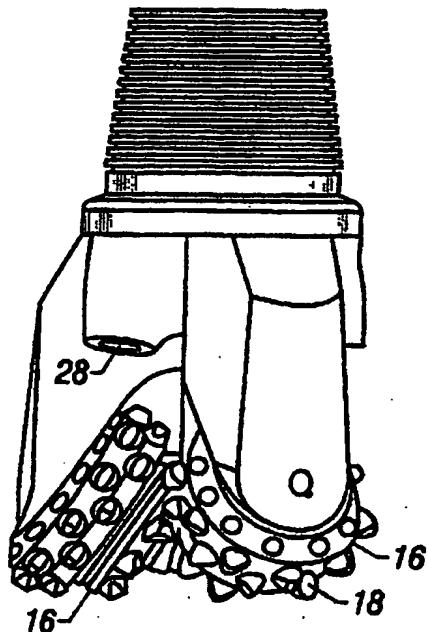


FIG. 12

Title: ROLLER-CONE BITS, SYSTEMS, DRILLING
METHODS, AND DESIGN METHODS WITH OPTIMIZATION
OF TOOTH ORIENTATION

Inventor: Shilin Chen Serial No: To Be Assigned
Filed: January 28, 2004

Attorney Docket No.: 074263.0208 Sheet 15 of 21

15/21

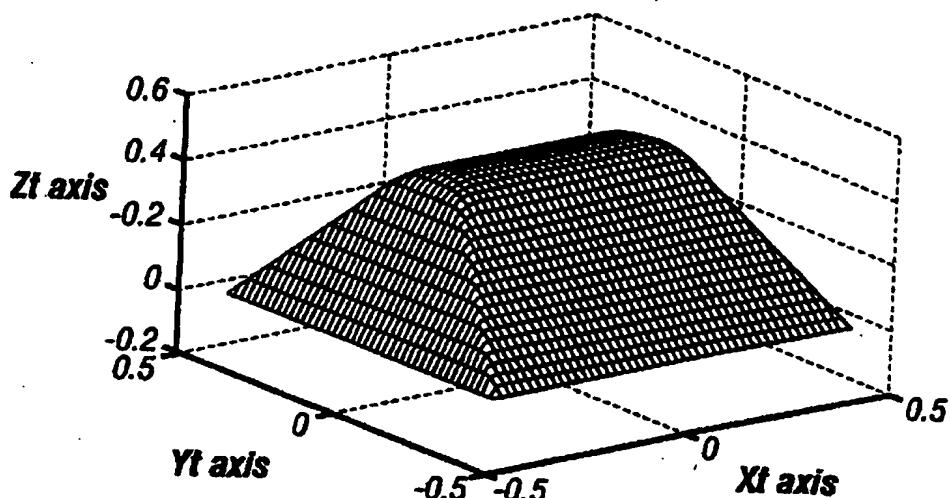


FIG. 13

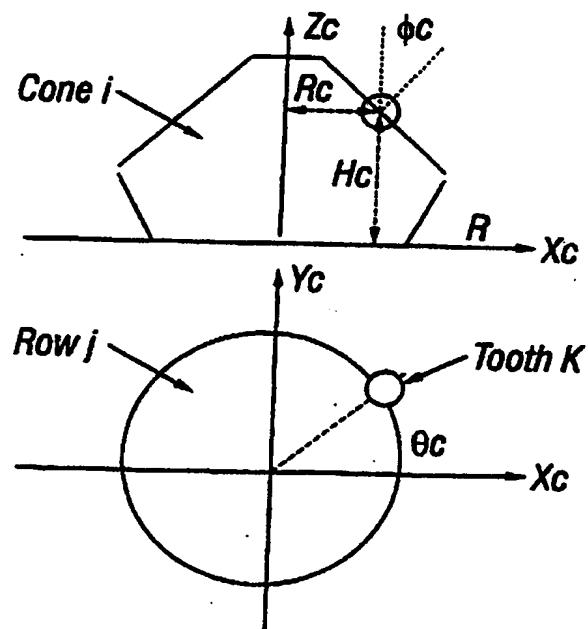


FIG. 14

16/21

Cone No.: 1; Row No.: 2; Bit Name: dsgn₂973₁; Offset: 0

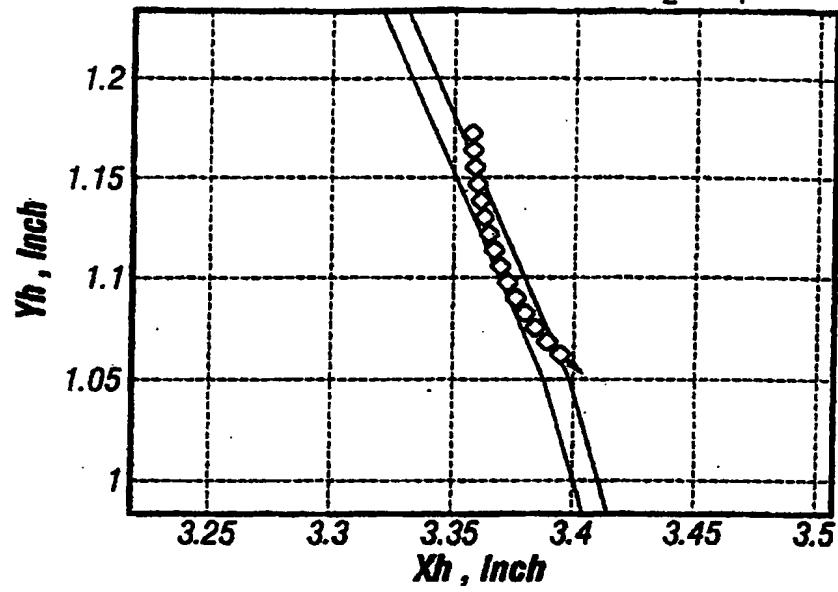


FIG. 15A

Cone No.: 1; Row No.: 2; Bit Name: dsgn₂590₅; Offset: 2

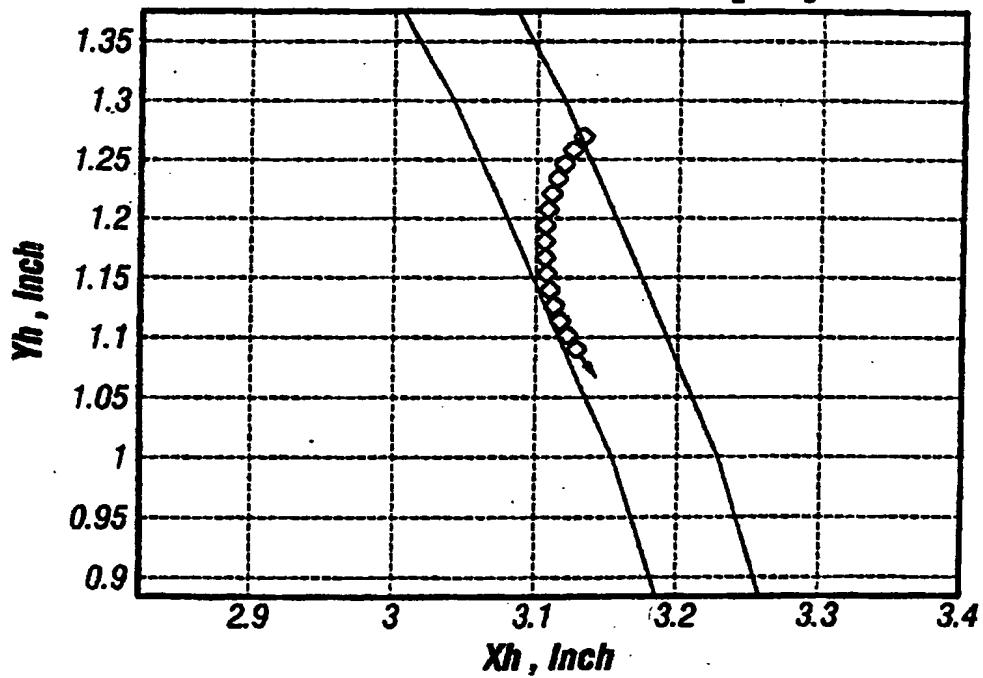


FIG. 15B

17/21

Cone No.: 1; Row No.: 2; Bit Name: dsgn₂782₂; Offset: 4

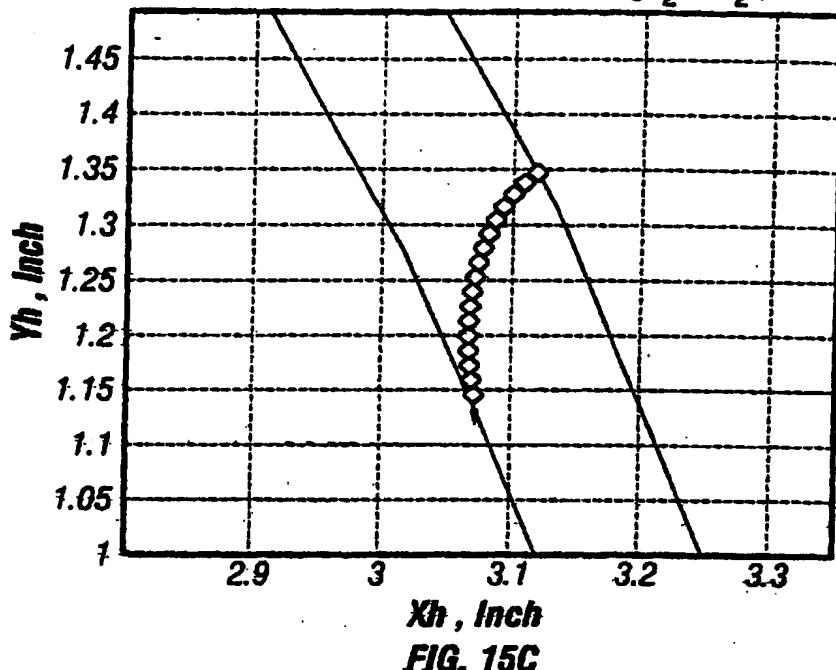


FIG. 15C

Cone No.: 1; Row No.: 2; Bit Name: dsgn₃044₃; Offset: 5

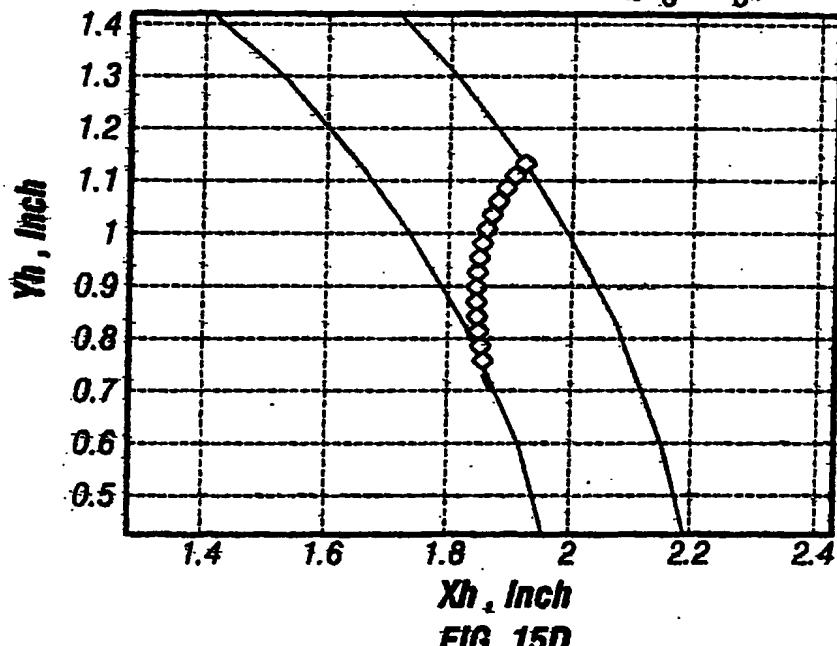
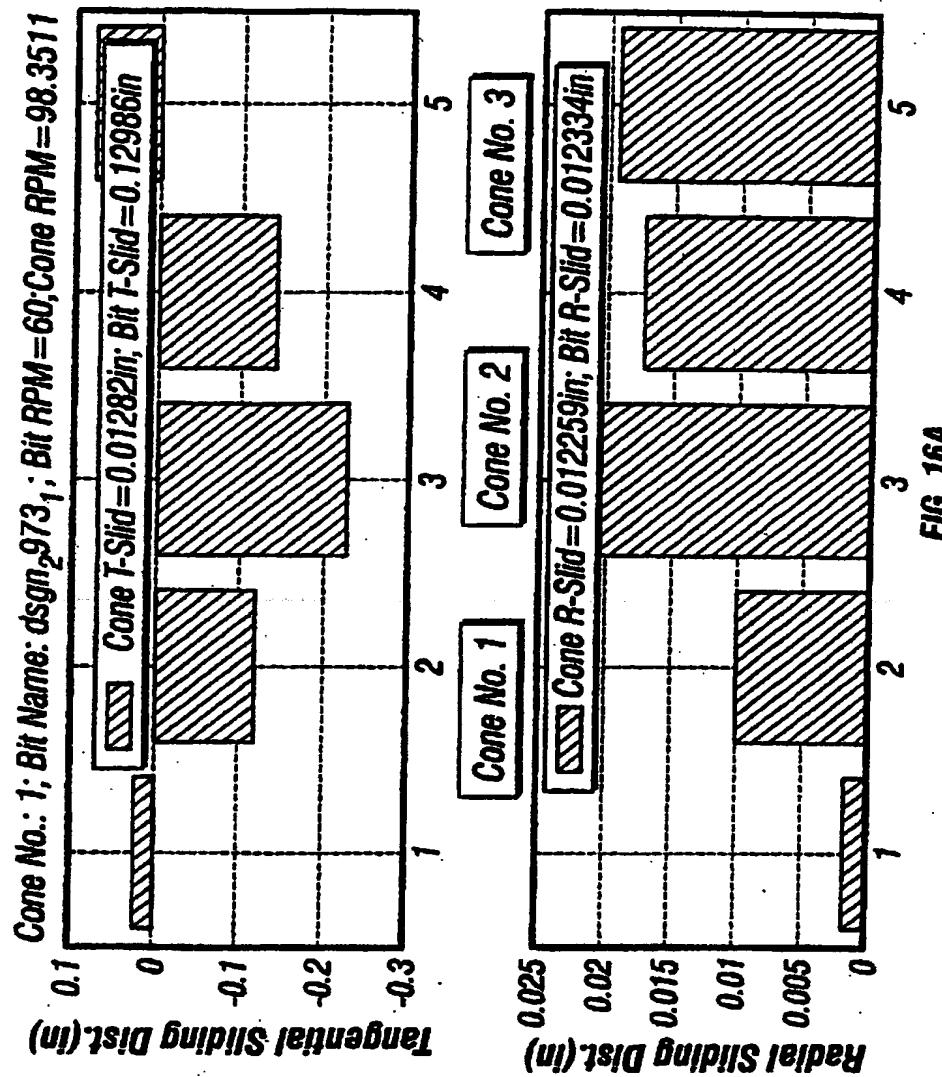
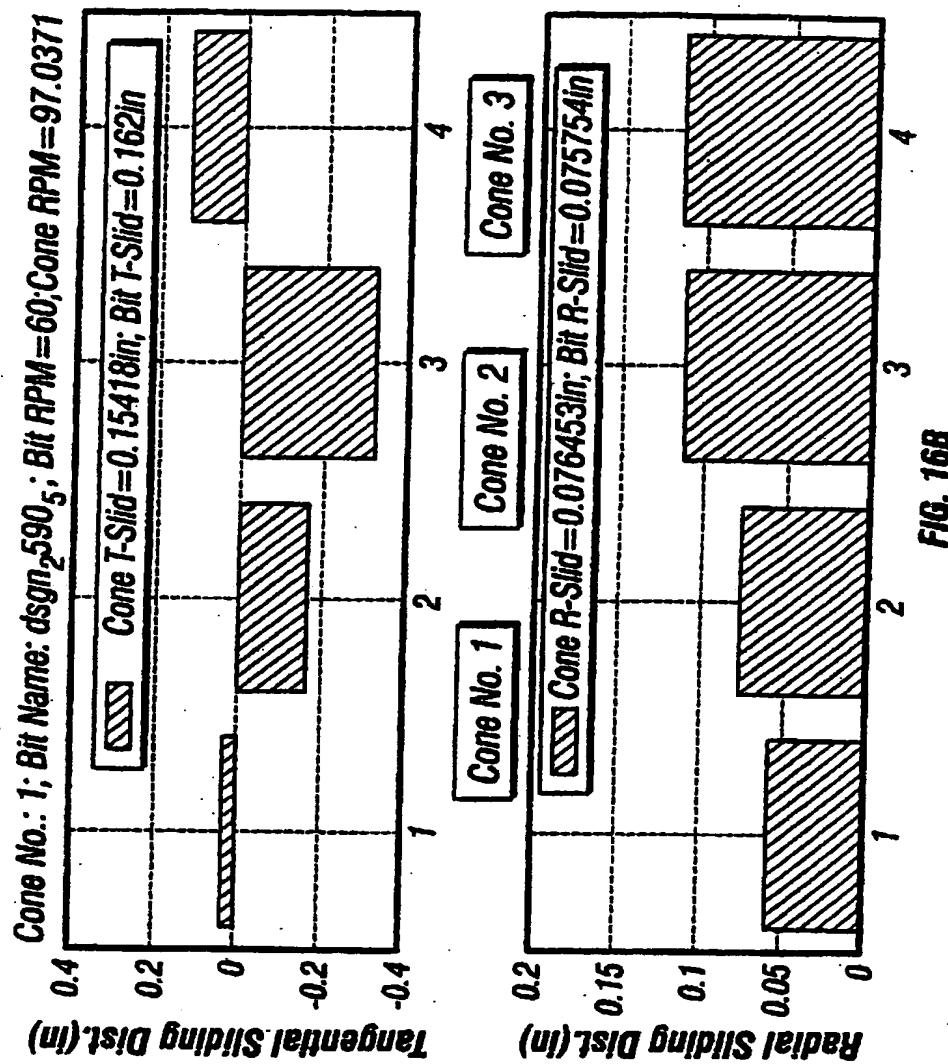


FIG. 15D

18/21



19/21



20/21

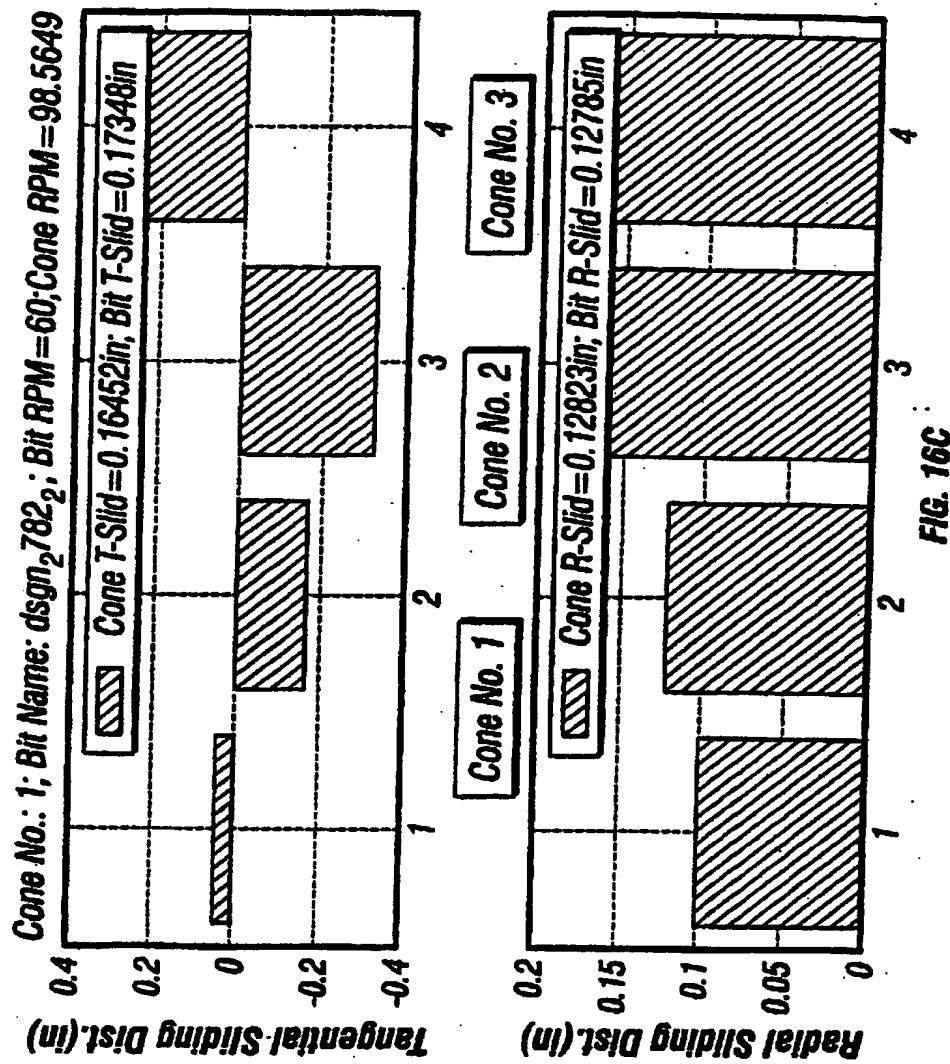


FIG. 16C

Title: ROLLER-CONE BITS, SYSTEMS, DRILLING
METHODS, AND DESIGN METHODS WITH
OPTIMIZATION OF TOOTH ORIENTATION

Inventor: Shilin Chen Serial No: To Be Assigned
Filed: January 28, 2004

Attorney Docket No.: 074263.0208 Sheet 21 of 21

21/21

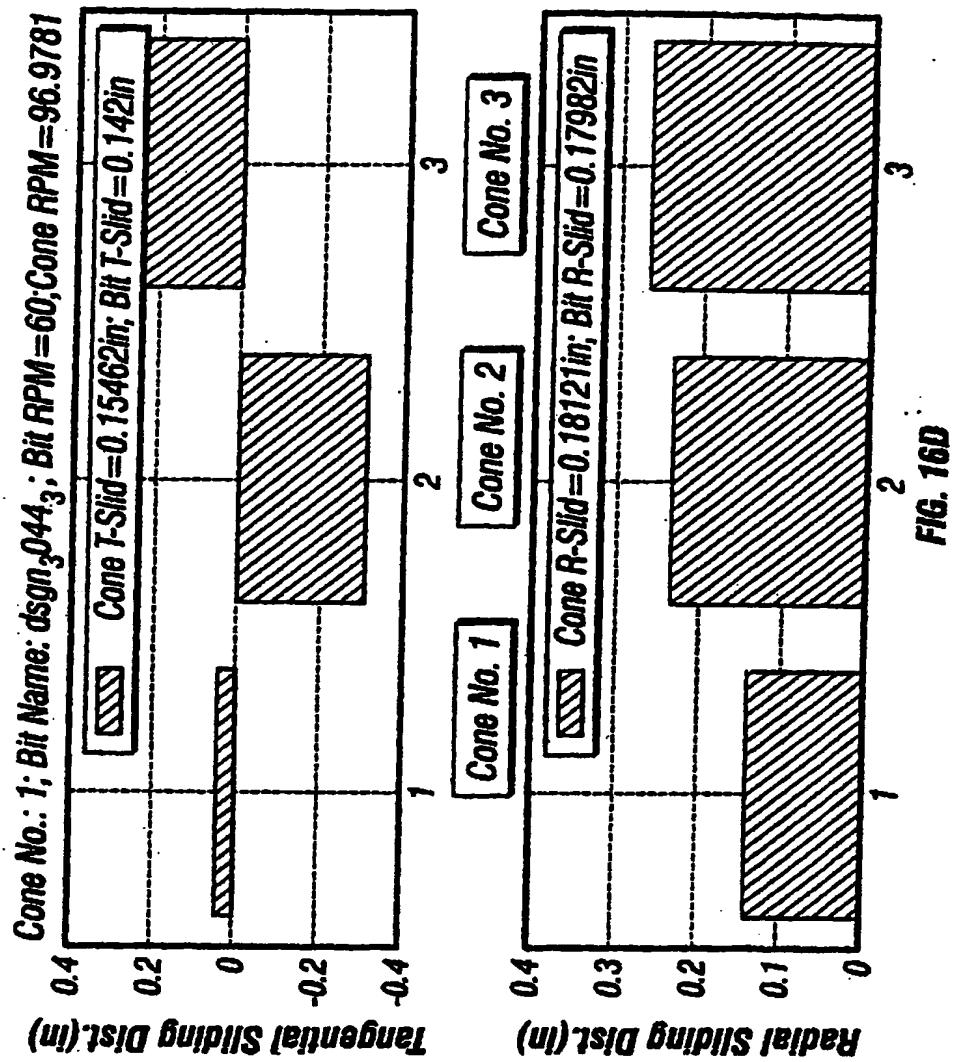


FIG. 16D